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SAVING TIME IN ELEMENTARY AND SECONDARY EDUCATION.[1]

THIS subject refers directly to the time element in education. It does not, however, present a problem in mathematics. Any solution, therefore, which is obtained by transposition will be a partial one only. There are two sets of conditions involved, each of which demands careful consideration with little or no emphasis upon the terms in which the desired answer will be stated.

The first set refers to the organization and relation of the school sections under consideration. It may be of interest and value in this discussion to review the manner in which the colleges and professional schools in this country have handled the questions of organization and relation which confronted them. The specific aim of the college and that of the professional school had been emphasized until it seemed as if college education and preparation for a profession or for specialization in science were antagonistic. A man or woman looking forward to becoming a self-supporting member of society found the beginning of apprenticeship in practical affairs deferred too long, if an effort was made to get something from both the college and the professional course. Progress in the solution of the time problem was made by the recognition of the fact that its conditions lay in both the common means and special aims of the college and the professional school.

To the general public and the conservative educationalists the

[1] A paper read before the National Council of Education, Boston, Mass., July 6, 1903.

reorganization of higher education has seemed to be directed largely in the interest of the short-term degree. This is a misconception of a movement which corrects a waste in time and effort, and thereby increases the efficiency of the schools concerned. With a fairly clear idea as to the general culture which should be the possession of a man or woman intending to specialize, and also of the knowledge essential in preparation for specialization, it was not difficult for the college and the professional school to determine their common means and so organize them that the responsibility in the common territory was properly placed, thus preventing repetition and correcting some tendencies toward indifferent work. On the other hand, with a clear idea as to the special aims of each, their relation to each other was sharply defined so that neither now attempts to do the intensive work that is the special function of the other. This concentration upon the organization and relation of the college and the professional school has rendered it possible for a student to secure the foundations of general culture, and out of them to develop specialized knowledge in less time and with better preparation than formerly, when subject-matter was indiscriminately appropriated by each section.

Turning to the elementary and secondary schools, we find a situation analogous to that which obtained formerly in the college and the professional school. With the development of the high school, the differentiation between it and the grammar school has been made sharper and sharper, until the time spent upon covering the work offered by the two combined has become excessive. The high school views its work, in comparison with that of the grammar school, very much as the professional school viewed its in comparison with that of the college. The treatment of subjects in the elementary school seems to fit the pupils in very slight degree for the work planned in the secondary school.

It is not unusual for high-school teachers to recommend, with great fervor and seriousness, limiting the elementary school to its special subjects, namely, reading, writing, spelling, arithmetic,

and grammar. The efforts to introduce more general culture into the lower grades through the reading of literary classics are often frowned upon by the teachers of literature in the high school. Some teachers of mathematics have an attitude of disapproval toward algebra in the eighth grade. Within the last year there has come under my notice a marked illustration of this general tendency. A class of eighth-grade children that had been studying Latin two years, upon entering a high school was advised and urged to renounce all pretensions to any acquaintance with Latin, and to begin the subject as if it had never learned a Latin word. The teacher is a college graduate and a fine drill mistress. She based her advice upon experience with classes from the same elementary schools in which the members of this class had been taught; and also upon her preconceived ideas as to the impossibility of elementary-school teachers successfully and intelligently teaching subjects which were in charge of the high-school faculty especially. A readjustment in the arrangement of the school necessitated sending this class to another building, and to a teacher who had no well-developed ideas about the limitations and weaknesses of elementary-school teachers when instructing in a high-school subject. The second teacher has an undoubted standing as an excellent instructor. The previous work of the class was accepted without comment, and the study of Cæsar was begun. The class proved unusually strong. This instance might be construed as indicating the complications often introduced into the school situation by personal peculiarities. To some extent that construction would be correct, but it would not include all of the conditions.

In many cities the marked distinction between the two schools has come to be felt so keenly that within the last few years conferences have been held, in which the high-school teachers have told the eighth-grade teachers wherein their work was poor, and the eighth-grade teachers have reciprocated the courtesy by telling the high schools wherein they have failed. As an outcome of these interchanges of opinion, some high-school principals have expressed a willingness to take the seventh and eighth grades

under their care; and, on the other hand, some elementary-school principals have expressed an equal willingness to keep their pupils a year or two longer, and instruct them in the subjects assigned to the ninth and tenth grades. These conferences are straws which indicate the direction of the general trend of thought.

It is usually said that the elementary pupils spend too many years in acquiring a slight acquaintance with the school arts; and yet, no one in touch with the best elementary schools believes their work is restricted to reading, writing, and ciphering. The facts in the case are that many subjects are taken up, but the heavy stress throughout the eight-year course is laid on rudimentary work which is not so developed as to lead into advanced work later on. It is the limitation to short reaches of experience in mental development and subject-matter that induces the strong teachers in the upper grades to emphasize the traditional in education with such stifling thoroughness. Those teachers sometimes doubt the efficiency of a school that enables its pupils to fit for the high school in less than eight years. They would be certain that a school which accomplishes what I saw done within the last fifteen years was radically wrong. A boy eight years old, unable to read, but with a method of his own in calculating, entered a school which covered the field of elementary and secondary education, and in seven years and ten months was admitted to Yale without a condition. Though he was not brilliant, he was a lad of good parts. As he was not delayed at any point in Yale, it is evident that his period of preparation was not too brief.

There are two points in the management of the school just referred to which are worthy of consideration: (1) the principal's daily experience ranged from the kindergarten to the college; (2) each teacher above the third-year classes taught the same subjects through the course for several years, thus giving continuity to those subjects and to the children's efforts with them. It is safe to assume that the arts of reading and writing were acquired in order that the children might use them in learning things; not that they might perform on a trapeze, devised

for reading and writing gymnastics. The principal with valuable subject-matter developing in his higher classes had no interest in playing at the school arts in the lower ones. The teachers also knew what development of a subject meant.

It is doubtless true that many elementary schools enable the more highly endowed boys and girls to prepare for the high school in seven, and sometimes six, years. The secondary schools, however, have not made it possible for even the most brilliant children to graduate in less than the four prescribed years, their general attitude being in favor of giving the children entering at twelve or thirteen years of age "time to grow."

A young girl who was unusually proficient in arithmetic entered a high-school class in algebra that had finished the fundamental operations, factoring, the greatest common divisor, and the least common multiple. She made up that work in three days, without assistance; and yet, neither the teacher nor the principal of the school thought it wrong to keep her sauntering in algebra through the remainder of the year. Each dwelt upon her proficiency in algebra and her having "time to grow." The attitude of both was in no way in advance of that of the strong teachers who devote the eighth grade to reviewing and polishing. The high-school teacher was beating around on a year's horizontal plane in algebra. Without doubt he and the principal supposed they were working on the departmental plan. The great majority of elementary-school teachers and principals are opposed to departmental instruction. They labor under the same delusion that limited the teacher of algebra. They think that teaching five classes a day, in the same subject, and at the same stage of advancement, is departmental instruction. It is horizontal repetition. This self-imitation and the general lawlessness met in the many classes are not attractive, are not stimulating to mental activity in a high degree.

The elementary and secondary schools should be organized on the vertical departmental plan. Soon after entering school a child should be taught mathematics three or four years by the same teacher. If he has marked ability, the teacher will know

what to do, for she will have classes in various stages of advancement in that subject. If he is not especially gifted, his teacher will keep him moving forward. He will not become a repeater. That teacher of algebra would not have thought of keeping the girl sauntering, if his daily experience had stretched along through three years of work in mathematics.

The greatest objection to the vertical plan is that it precludes the possibility of teaching children in droves or herds of forty, fifty, or sixty. As teachers discover the possibilities in individuals, they develop what might be termed an educational conscience, and are constrained to give mind a better opportunity.

Ineffectual approaches to subject-matter, methods of treatment of subjects that are evolved out of nothing and lead nowhere, are useless in every stage of education. Elementary and secondary education cannot be differentiated until the second of the two sets of conditions involved in the problem is considered. That set of conditions is named the "course of study." The chaotic situation as regards the course of study has resulted largely from the reaction against the rigid college preparatory requirements that long dominated the ideal of education in the school. The struggle and victory of the scientists in the war against classical learning to the exclusion of scientific investigation have affected elementary education more than secondary. The secondary school snuggled under the wing of the college so long that the college in coming out from the contest with the scientists has greater flexibility than the secondary school. It is the elementary school with its nature study, household arts, manual training, and parents' associations, that has stood for the scientific reformation below the college and has for a long time perplexed the secondary school. The latter has, however, taken on some of the arts of the common people, and has begun to comprehend their significance in education.

The colleges have broken away from their single list of requirements for admission. Today in the more progressive universities there are groups of required preparatory studies

leading to nearly every department of learning known to the modern mind.

The college and the technological preparatory courses are so arranged that the manual training, household economics, the beginnings of science, and the training in art and literature should find through them an entrance into desired advance work. The time has come when elementary and secondary education must be unified and then differentiated. The great course of study must be reduced to reasonable proportions, and then intelligently apportioned between the grammar and the high school, with a clear understanding of the relations and responsibilities involved. The preparatory courses for college, and those in manual training, household economics, nature study, and school arts, offer abundant material for continuous lines of work. Every elementary subject should be so planned as to lead naturally and necessarily into advanced study in that same subject in the secondary school; that secondary study should necessarily lead into the treatment peculiar to the college.

The high-school courses are now arranged in elective groups; the grammar-school courses should be so arranged in their last three years. Something of the kind obtains in cities in which modern languages and Latin are taught in the seventh and eighth grades with the exception that the child taking an extra language is usually forced to take it in addition to the rest of the course. If we could break away from the fear of having classes in which all of the members of the grade do not recite in every subject, it would not be difficult to arrange these groups. They would settle the question of the course of study for the children intending to go into practical life at the end of the eighth grade, and for those in the same class intending to enter the high school.

The National Council could do nothing greater than to set a body of competent men and women to working out the course of study for elementary and secondary education. It would accomplish little if the elementary-school teachers were left voiceless. Experience in the great educational movements of the last quarter of a century, sound scholarship, and organizing power

should be brought to bear on this problem of saving time, improving the quality of the work, and not overcrowding the children in the elementary and secondary schools. Whether an effective solution will be secured soon or will be delayed years is an open question. The attitude of this Council will have great influence in the decision.

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SOME STEPS IN THE EVOLUTION OF SOCIAL OCCUPATIONS.

VI.

THE attitudes of the child in relation to those of the civilized adult present these contrasts: the child's attitudes are undifferentiated, those of the adult are differentiated; those of the child are idealized forms, whether considered with reference to the past or to the future; those of the adult are real; the attitudes of the child are largely practical; those of the adult, though practical, may, and often do, become intellectual, and hence abstract.

In making use of the materials of the remote past perhaps the greatest mistake that is liable to be made is the failure to recognize that the child's attitudes are dramatic rather than real. In the use of the materials of more recent ages the danger is, rather, the failure to recognize that the child's attitudes are practical in any sense of the word. Too often the child's attitudes are regarded as intellectual from the first, and he is compelled to assume an attitude which he is unable to take. In this way educational forces are diverted from their normal channels and devoted to fostering a juggling with words, a repetition of formulas, a playing with symbols.

Practical activities—social occupations—are so new a feature of public-school work that there are yet many unsolved problems with reference to their place, their form, and their function. When they are mentioned, ideas of the simple household industries, on the one hand, and ideas of the isolated hand-work which is becoming popular in the schools, on the other, are most likely to come to one's mind. But neither of these conceptions is sufficiently comprehensive to include all that is implied in the educational use of practical activities.

The house industries were carried on in the home at a time when society made fewer demands upon the individual than at present. Communities were isolated, and in most respects self-

sufficing. Life was simple. There was little demand for special knowledge or skill in the sciences and arts. Industries were carried on in the home for the sake of practical results. The experience thus gained served as a means of interpreting the formal instruction given in the school when schools were established; but neither the teacher nor the parents made any conscious use of these experiences in developing the principles which underlie the sciences and the arts. The demand for the scientific method and for scientific knowledge was not great enough to bring such problems to consciousness.

The question so often raised regarding whether a boy shall be taught cooking and sewing, or whether a girl shall be taught carpentry and metal-work, serves to indicate that we are not yet free from the industrial bias which compels us to interpret results with reference to utilitarian ends. In the introduction of handwork into the school we have swung to the opposite extreme. Ostensibly it has been introduced for educational ends. In most cases it is planned from the logical rather than from the psychological, the technical rather than the practical, point of view. The isolation thus brought about is completed by the failure to make use of the technique involved in the mastery of processes having other conscious content than that of technique. Such courses, though they may answer to the abstract conceptions of the pedagogue, and serve as a temporary means of facilitating the division of labor and the work of administration, fall wide of the mark. They leave the child quite out of the account. To be sure, the child finds in isolated activities, which call into play certain powers of body and mind, a respite from a program made up largely of intellectual tasks; but this is not enough. The attainment of educational ends surely implies more than a sandwiching of rest periods into a so-called intellectual program, the establishment of certain physical and mental co-ordinations, and the learning of the grammar of a language for which there is no demand. As far as it goes, exercise in technique is well; but unless technical skill finds support in ideas, unless motor activity finds a place with reference to the curriculum as a whole and to the society in which the child lives, the energy which is now

being devoted to isolated forms of hand-work will soon be expended in the form of a "fad."

The introduction as isolated activities of such industrial arts as basketry, loom-weaving, pottery, cooking, sewing, carpentry, and metal-work is a failure to make use of conditions for securing educative results. As long as the child's activities are simple and direct, less harm comes from such isolated activities than at a later period; but even at the earlier time they fall far short of meeting the needs of the child. When the child is able to project ends into the future, when he is able to reconstruct past situations and to carry over the embodied truth as a means of guidance in his own activities, to permit conditions in our public schools which keep the experience of the child in the personal, the local, and the material, when he is able to make the transition to the social, the general, and the spiritual, is to do violence to the best thought of the age.

The school presents conditions for a much more vital use of practical activities than we have yet made. It is protected from hostile elements, and surrounded by a veriety of socializing influences; hence surplus energy and leisure are assured. To secure the most complete development of the individual and the most efficient service for society, there is need of incorporating into the curriculum such achievements of mankind as can be appreciated by children. There is need of using a method which will permit the child to make use of the forces at his command in securing such a first-hand experience as will enable him to interpret that which is most significant in community life. There is need of an ideal in harmony with the highest conceptions of civilization, and a consciousness on the part of those who have education in charge of the significance of the work in which they are engaged.

It is thus evident that the introduction of practical activities into the school does not imply that the simple house industries of pats ages are to be carried over without change into the school. Neither does it imply that the child is to be occupied with isolated activities selected from modern processes for the sake of technique alone. It implies rather that the impulses, which originally were produced by industrial activities and which appear as power-

ful forces in the life of the child today, shall find opportunity to express themselves in forms that appeal to children, and at the same time shall connect with modern institutions which, in a large measure, condition the life of the child.

Early undifferentiated forms of industrial processes which have since been rendered complex are the most suitable occupations for the child of seven years. To select a simple form which has not developed would be to start the child on a road that led nowhere, to keep him occupied with a belated form, or to put him in the place of the adult whose function it is to bear the brunt of the struggle involved in breaking the way into the unexplored regions of thought and action. The various phases of the fundamental undifferentiated industries afford educational opportunities for acquiring an experience fundamental to the future study of the sciences and the arts. When this basis is laid, when the child has followed the development of an industry to a point where some phase of the process becomes so important to society as to have fixed attention upon itself for a period, he can appreciate the forces and conditions which called forth the sciences and the arts. The special problems that thus face the child, the enriching materials that are furnished by the racial experiences in the processes considered, furnish a suitable stimulus to the child's interests which are becoming differentiated.

The best way of introducing practical activities into the school varies with local conditions. That which is to constitute the first-hand experience and that which is to be interpreted by means of symbols can be determined only after a knowledge of the environment which conditions the child's acts.

The stage of development at which the child has arrived is also an important factor in determining the form which the activities shall take. To the child of five or six years, who draws no sharp lines between actual materials and processes, and a dramatization of them, practical activities may well take a different form from what they do when the ideal and the real world come to stand out in marked contrast. Play is as real as work; pantomimic representation is as satisfactory as actual participation. Since the most powerful appeals come from the immediate

environment, and since many of the stimuli are somewhat complex, it is fortunate that the child has at his command modes of expression that involve the simplest kind of a technique. Gesture, pantomime, dramatic play of all kinds—all these forms are as well adapted to educational ends within the school as they are to the normal growth of the child when left to his own resources. They are especially adapted to the service of the child at the time when the steps in the process, the relation of means to ends, and the result of the actvity are matters of little moment.

As long as attention is largely absorbed in direct activities, there is little demand for a conscious use of racial experiences. In so far as the materials of primitive life affect the child, it is in an unconscious way. The child's experience is not of a kind to enable him to interpret the achievements of the past. Not until he is able to appreciate means and ends as such does he possess the historic sense to such a degree as to make a conscious use of the materials of the past. It is through the teacher that the lessons contained in historical primitive occupations are to be transmitted during these early years. In so far as the teacher gains the spirit of these lessons, in so far as she applies it in her work with the child, she will allow him to participate in present activities that call for the use of the entire body. She will make sure, on the one hand, that the occupations are of such a fundamental and permanent type as to relate a great variety of impulses that are in need of development; and, on the other, that they organize the materials of the external world with reference to relationships that are vital in the upbuilding of social and industrial institutions. The lesson of the past is best heeded at this time by an apparent disregard for its materials. Time is better occupied in focusing attention upon the direct and immediate problems that involve the use of the materials and forces in the environment than in attempting to utilize the materials of the past before the organs are developed by means of which they can be apprehended. The serious search of primitive people for food is paralleled by the spontaneous play of the child in meadow, field, and pasture, or on the playground, in the vacant lot, or in the park. The hunting dance is paralleled by

rhythmic social games which the child invents for the satisfaction of the group.

The organization of the spontaneous activities of the child by means of field lessons, games, and other practical activities is a necessary means of securing the conditions for a free play of the child's powers. It is a necessary means of gaining a rich experience in the processes that are fundamental to community life. Gesture, pantomime, dramatic play of all kinds, construction, observation, experimentation, drawing, painting, modeling, music, language—all are proper avenues for the child's energies to find expression. All contribute something to his growth and to the satisfaction of instinctive attitudes. No one of these activities is of interest at first on its own account, but each is present as a phase of a larger process. From that process the different interests gradually emerge, just as those which represent the sciences and the arts emerged from the industrial activities of the race.

The child of seven years may well begin to make a conscious use of materials of the past. This is the time when he begins to recognize the inadequacy of the means at his disposal to secure a desired end. For this reason he eagerly avails himself of such opportunities as promise to yield him the aid he needs without too great a strain of attention.

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PRIMITIVE HISTORY IN PRIMARY GROUPS OF THE LABORATORY SCHOOL.

II.

THE amount of time to be spent on each stage of this reconstruction of primitive society varies with the experience of the children and teacher. The step in social organization demanded by the change from the wandering hunting life to a stationary life is slight, so that it is hard to make the children realize that man's control of his methods in obtaining food through combination must have vastly improved, or that some specially favorable locality must be found to warrant the assumption of the settling down of a wandering family in a permanent abode. As with all steps in this work, the amount of time in experimentation, in actual construction work with materials, must be of necessity left to the teacher. Children of seven have been found to be very much interested in the subject of underground water, either as related to the formation of caves, or in a later period as furnishing a nomadic tribe with its supply of water on the lower, grassy plain. Some children have been found interested in the nature of the stone in which caves are found, and in the essential differences in the wearing away of a rock by water, as dependent upon the nature of the rock.

From the very beginning the main geographic features, such as in this period of forest life the location of the forest and its relation to water-supply, were of much interest to the children. They experimented with nut seedlings at various times, and cared for the seedlings which survived, unexpectedly, the vicissitudes of a Chicago schoolroom in winter. The dependence for germination of certain nuts and seeds on exposure to a freezing temperature is an illustration of the kind of problem it has been thought better from experience to reserve for a later age. Such facts as the distribution of trees as varying with altitude have been found to be material for these children *only* when in their past experi-

ence they chanced to have actually seen the condition controling such distribution; then such general points as that some seedlings could survive cold and exposure, and hence live farther north and higher up on the mountains, seemed to appeal to their intelligence. The way in which the occupation of the people depended upon the geographical area was brought out through discussions in which all their individual experiences were of necessity brought together.

The ideal outline in the teacher's mind was as follows:[1] A mountainous region with forest-covered hills stretching down to a lower level where the forests are confined to the river plains, and the low foothills and grassy prairies stretch downward to the sea. Nomadic hunting life, first beginning in the upper section of the forest, then gradually, as weapons and power of combination advance, descending to the plains and becoming transformed first into the nomadic hunting tribe, combining hunting with a semi-pastoral life; then into the semi-agricultural, as the advantages of the natural grain-producing regions are combined with a roving and hunting life after the harvests are over. This half-way organization merges both in habitat and method of life with the pastoral nomadic peoples and again advances to the agricultural stage and security of permanent habitation in the fertile river valley. Down upon the edge of the sea is found the typical fishing village, where perchance the stress of circumstance forces the development of the trader and organizer of commerce, as typified in Phœnicia, or combined with the semi-pastoral and agricultural habit, as found in the Grecian archipelago. The main geographic ideas which the children work out in this outline are the formation of a river system, the relation of kind of vegetation to the water-supply, and the dependence of the animal life of the region upon this vegetation. Any further geographic knowledge in detail and the particular points picked out for experimentation depends entirely upon the children's local surrounding and previous experience. The statement perhaps can be made that the reproduction on a sand table by the

[1]Acknowledgment is due Mr. Patrick Geddes for suggestions received from a lecture on Scotland as an illustration of the typical historical development of a country.

children of the features of the country they are constructing is a safe test of their geographic notions only when they are carefully guarded against misconceptions, especially in the relation of size and distance, by the use of pictures and their own past experiences. Such simple physiographic points as the action of water in cutting away gulleys and ravines, the way in which this rock waste is deposited in the downward course of the stream, involving the formation of beds of sand, sandstone, clay beds, and slate, and the effect of the change of level on the course of the stream, can be given in such a way that they become a part of the child's general experience, as is shown by the fact that he spontaneously uses these terms in a report of what he has seen happening in the swiftly running gutter.

In the case of the city children with whom this work has been done, the continued interest depends largely on the personal element in the story the development of which they are following. As might be supposed, it has been found that the balance of interest sometimes lies entirely in the personality of the story, and then again swings over to interest in materials and processes carried on in the day-by-day illustration of the story. In one case the chief concern was almost continuously in the things to be done; with another class, in the dramatic and personal, and what would happen next to the particular characters in the story. This difference is probably due to a difference in the personality of the children, as approximately the same methods were used with children of similar environment. As before stated, it has also been observed that, without any apparent reason other than the individual experience of the children, a narrative read was preferred to one which they had some share in creating.

In any stage of this social reconstruction one of the children's main interests, especially in the beginning of the year, is in the life of the child of that time. This interest, though a reoccurring and ever-present one, is not as dominant as might be imagined. The doings of grown-up primitive society are well within the scope of the modern child, and give the freedom which he spontaneously enjoys when he gives himself up to his imaginings of that time when everything will be possible—when he himself is grown up.

Most typical enterprises carried on by primitive peoples are toward the doings of these grown-up people of the past finds its reflection in the interpretation by primitive people of those natural of a kind to employ the child's imagination and satisfy his dominant need of simple motives and much action. This same attitude phenomena which they could not understand.

The child's attitude toward the old nature-myths as the stories which these people told to account for mysterious happenings is of the same kind as toward the fairy-story. And while we find an interest in the stories as told, we rarely have any spontaneous invention of myths to explain natural phenomena. The child's imagination seems to select the activities of the people as its chosen field, rather than the more remote field of personification of natural forces. Unless distorted and made blasé by indiscriminative cramming of fairy-story and myth, the child's natural interests are necessarily objective at this stage.

The dramatic side of the occupational work seems, as might be supposed, much stronger in older children. This dramatic sense appears not only in the interest of the movement of the story and in acting out those events as well as they can, but also in the effort to meet the difficulties they encounter in the story. In trying the experiment of carrying this interest and dramatic expression into the form of a play in which certain events of importance to the tribe were acted out, the children showed an appreciation of two, if not more, of the general principles of the drama. The chief theme of the play was the conflict between two hunting tribes for the possession of a hunting ground. After one or two attempts, they realized that the first part or act must show the causes of the conflict which formed the climax of the play; and secondarily, instead of having the climax come at once, as at first proposed, it would make the action more interesting to have it worked up to, through smaller acts of aggression which would lead to the final conflict in the third act; while the fourth act showed, in a dramatic meeting of both tribes, the final adjustment through the submission of the aggressors. In carrying out any such work as this, as can easily be seen, the children use the same skill and concerted action as are involved in

the daily performance of the class work. It has been found that, as interest in the result grows during the year, while personal preference still plays a large part in the choice of work and the assignment of work-fellows, there is a progressive increase in the discrimination of choice made from the side of ability. This kind of dramatic representation of events is of great assistance in the bringing to consciousness of the development of social organization in each stage; for example, the later phases of semi-pastoral and agricultural life, involving as they do the transition from a matriarchal to a patriarchal form of government, develop the fact that leadership, which was given hitherto for reasons of personal bravery or physical endowment, now naturally devolves upon the older people, who have the advantage of long experience and are the possessors through tradition of the experience of former generations.

The final stage attempted is that of the pre-Homeric period, where the chieftain or leader ruled through a council of his fellows. This furnishes many points in common with the children's own method of class government. The change from the communism of the early period, through the growth of individual rights—first in the right of personal property, then gradually extending itself from weapons and ornaments to flocks and herds, and then through the right of continued occupancy of the grazing lands with their wells and water courses—leads finally to ownership of land in the agricultural period. These ideas are, of course, accompanied with much discussion of what is done now in respect to these rights and customs, thus furnishing no slight insight into the functions of those parts of the city government with which the child has come in contact. While these connections with the city life about him are of value, yet the most powerful factor in developing a sense of responsibility along with the sense of individual rights is found in the formulation of certain communistic rights—to school material, furniture, and rooms—along with individual rights and privileges—in order and arrangement of class work, choice of seats, and other such details. As these rights must be respected, not only by the children, but by the

teachers, a true democratic ideal has a chance to express itself, along with its inevitable accompaniment of individual responsibility. Possibly the only safe test of progress in the sense of responsibility is found in the difference between the way in which the group at different times in the year meets a trying situation, which in the beginning of the year would have resulted in demoralization.

It will, of course, be objected here that any ordinary child of seven or eight already possesses, by virtue of his past experience, such ideas as these of personal and community rights. But these ideas are implicit with him, just as are his ideas of time, distance, etc.; and he needs to be made conscious of them through use in new situations. It has been found that, as a general thing, children take for granted such rights as individual ownership of weapons or clothes or food, as well as the right through occupancy or discovery. It is only after much discussion that these youthful individualists could be brought to agree that without community of goods life would have been impossible in the early stages of society. One of the most important gains through the development of this sort of consciousness is the early acquiring of the sense that rights and duties are relative, not absolute. Similarly, it has been found that children take for granted combinations of families in clans and tribes. It is necessary to show the gradual development of such combinations through long discussions of what would bring about the earliest consolidations for defense or aggression. The matriarchal order of society seems to be easily taken for granted, while the rise of the patriarchal has to be developed, both in connection with the nomadic hunting of the semi-agricultural tribe and again in the organization of the pastoral people. Thus far it has not been found profitable, principally because the details of organization will in no way correspond to the natural order demanded in school work, to lay very much stress upon the forms of prevailing customs determining the government of such semi-agricultural tribes as the Iroquois nation. Indeed, the general form of a deliberative assembly, in which the right to speak is an inherent

right belonging to the elders and must be earned by the young, is the only form of government at all consciously carried out, because of its similarity to the actual class order in school. Such complications as are introduced by the use of captives and slaves, while often suggested by the children, have never seemed worth worth much time and effort.

Thus far experimentation has shown that this work can most easily be carried on by the following distribution of time and method of treatment of the subject-matter: About an hour and a half a day is necessary for carrying the class through the stages summarized to the pre-Homeric period. This hour and a half will, of course, be distributed differently at different times of the year. The general average might be stated as follows: one-half hour for story and discussion of plans of work, followed by at least an hour of constructive or experimental work. This constructive work, of course, varies in its nature. It may be either illustrative of the life of the people which the children are playing, such as the making of the houses in which they lived, the clothes they wore, or the weapons they used; or it may be the carrying on by the child of some of the occupations of that people, such as the threshing of the grain, the grinding by primitive methods, or dramatic representation of their hunting, fishing, or warfare. A very little of the sensational—that is, battle, murder, and sudden death—is more than sufficient.

The occupations involving quiet thought and inventive skill furnish most of the hand-work for the children. As has been stated in the introduction, at least two lines of work involving modern equipment are carried on. Carpentry and cookery go on parallel with the constructive work involved in the primitive history of the children, while in their art and music we find the influence of the ideas they obtain from the primitive history, continually appearing, often without any conscious knowledge on the part of the special teacher. An illustration will be found in the following song, composed by the children and entirely suggested by them, the teacher not even knowing of its connection with their discussion with their class teacher, nor the latter being aware of the composition of the song:

Indians weave pretty blankets and rugs;
Esquimos live near the pole;
The Philippine houses are made all of straw;
And Cave-dwellers lived in a hole.

The Japanese make many beautiful things;
Poor Chinamen live upon rice;
The English people are fond of war;
And Americans all are nice.

For the reasons given in the introduction, much of the construction is with entirely crude material, and selection of the work to be done is made on the basis of the possibility of initiative on the part of the child. The process selected is the simplest and shortest, from the point of view of time, that can be found, and the use of modern methods, simplified and suggested by the children, is freely encouraged. The number of processes and occupations depend of course upon the experience of children and teacher. It has been found best to have the experimental and indoor constructive work involved in such occupations as pottery-making, beginning of textile work, metal-work, and the various processes connected with the preparation and storing of food carried on during the fall and winter terms. It is also a good plan to use the spring term as a time for a summary of the hunting, nomadic, pastoral, semi-agricultural, agricultural, and metal-workers' stages, through dramatic plays carried on out of doors. This involves actual out-of-door cooking, and gives a setting to the garden work and excursions to the park, etc.

The accompanying illustrations will show the way in which the children put in concrete form the physical setting for each people. Many examples could be cited to show that the main test of the success of this work—that is, the carrying over of the ideas gained into an interest and understanding of similar processes going on at the present time—has been fulfilled. One girl, while working at her first clay dishes, after discussion of the very first steps following the hollowing out of the clay ball to make a bowl, evidently going on in her own mind with the conditions now existing, asked many questions and had many

ideas as to the way in which pottery-making was now conducted. After going through the school work with metals, one boy constructed an oven at home in his yard, and for more than a year, with the help of his playmates, went on experimenting in the various ways of melting lead and making molds. He also induced his father to take him to a foundry, where he saw iron cast, and is reported as having appreciated and understood what he saw in a way that seemed beyond his years. Another boy remarked, apropos of a school custom which had become a "rule": "That's the way our laws came, isn't it? And school rules are school laws."

In the first attempt to put into map-form the country in which their people were living, the children's initiative was quite limited, and each point needed much discussion and suggestion on the part of the teacher. As an illustration of the degree of independence attained through a year of such work, we might take the construction of a country on the sand table, which involved the use of all the principal facts the children had had, and the different physical settings they had worked out. There was no longer any necessity of the teacher's referring to a general slant of the land toward the sea. The course of the river, coming in through the steep part of the country where the slope is great, was made straight through a canyon, while on the lower sand plain the children, before turning on the water which was to determine the course of the river, declared that they knew the course would be such and such (indicating the winding through the flood plain), placed obstacles where they wanted the river to wind, and planned the location of their village. In locating a clay bed, which at first involved considerable experimentation, they did not hesitate to suggest that this clay might be deposited anywhere along the course where the water formed a pond or lake, or would be uncovered where the land had changed level and the new course of the stream had washed away preceding deposits from an old lake bed. In making the river bed they carefully chose water-washed pebbles. The stones which cropped out on the surface of the ground in various parts of the country

must conform in nature to the general outline, the flat limestones and sandstones being placed in the river valley, while the bowlders on the mountain top were chosen from the granite or schists.

The formation of black loam had been discussed in connection with the growth of grain in their semi-agricultural village, as well as in the making of their gardens, so that in the construction of this new country in the spring the children naturally suggested placing a covering of black earth over the sand back from the seashore and up the valleys of the river, to represent the accumulations of past years of vegetable growth. They had seen many sections of soil about Chicago, and in constructing their last country they placed flat rocks to represent rock bed, and the sand on that. One of the children objected, saying that he thought there might be layers of clay coming in between, as he had seen it in the cutting near his home. The fact that clay is much more impervious to water than any other soil has been brought out in many ways, and now, when they met the difficulty of keeping the water of a mountain stream from becoming underground water, as they call it, the suggestion arose that they line with clay the course which they wished the river to follow.

In connection with the construction of the seaboard village, the question came up of the difference between the ocean and the lakes. The children who had been on the sea described the action of the tides, and said that the ocean was not only salt, but bitter. One child then said that the river in going over the land carried away salt from the rocks down to the sea. Another child, carrying on the same thought, said: "Then the water goes away, but the salt does not." We then took up the question of why the sea-water was bitter, and a child said: "There are other things besides salt in the sea; perhaps sugar." All were ready then to try to find an answer to their question, stirring up sand and black earth with water, and then straining it, as they called it, to see what the water got out of the soil. Another question which came up in this connection was, what was concerned in the distribution and formation of the black loam, aside from the

action of water; and the question of growth and decay of various plant-forms involved again the part the earthworm plays in the making of soil.

While the children were much interested in the question of how the people manage to navigate the sea, the occupations of the sea-going people were not followed out, lack of background in the children's own experience being here, as always, a determining factor. Nor did it seem best to introduce more than the most primitive forms of transportation, trade, and barter.

One main result gained might be stated as the necessity of the teacher's consciousness of the *importance* of furnishing such material that the processes used spring through the child's initiative directly from the nature of that material and are conditioned by his consciousness of the end.

The result of five years' work on this problem has seemed to indicate that this subject-matter meets the following main requirements demanded in work for the children of this age: First, from the teacher's point of view, it organizes materials and sets the standard of technique within the reach of the child's capacity without in any sense impairing, because of the very contrast, his possibilities for future technical finish. It furnishes simple and definite activities, with plenty of opportunity for making the child conscious of the necessity of plans for the accomplishment of an end. Finally, and perhaps most important of all, it furnishes in a simplified form types of the principal activities with which he comes in contact with his own life. It furnishes, through its analysis of social organization, appreciation of the rationale of the organization he works out in his class, as well as of the organization of society outside of school. Lastly, there is no danger, through too persistent use of imitation, of depriving the child of the initiative and ruining his natural experimental attitude. The beginning of his acquirement of reading and writing can be easily made through his interest in the stories he or others invent, and the desire to keep a record of the work he is accomplishing, while the constructive work, as well as the geographical construction, furnishes many opportunities for the

development of the arithmetical sense. If carried on with a sympathetic sense of the child's present, he can be led rightly to appreciate, through this simplification of typical life-activities, much that would otherwise be confused and sensational in his daily experience.

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MODERNIZED ARITHMETIC.

When the troubled educational situation has found its new equilibrium in a thoroughly modern and thoroughly organized curriculum for the elementary school, no subject will be found to have profited more than the arithmetic from the effects of the period of general disturbance and readjustment of levels through which we are now passing. This will be true, moreover, not because arithmetic will have changed its essential character, but because the scale for estimating its value as a school subject will have changed. It takes no seer to discern that the lashing of the waves of popular and semi-professional disapproval of formalism and archaic ideals in elementary teaching must sooner or later wear away the crust of tradition and leave exposed some bed-rock principles of education. Nor is it pure optimism to believe that this period of new educational ideals is near at hand. When it shall have arrived, the old conception that the chief value of arithmetic in the schools consists in the mental discipline it affords will have yielded primacy to the conception that the chief value of arithmetic as a school subject is economic. Arithmetic will in the near future be looked upon as that common school subject which in a pre-eminent degree puts the pupil into an intelligent appreciation and a working understanding of the forces and factors which are shaping community life.

As an ideal this latter conception of the function of arithmetic receives the general consent of the leading educators even now. About the only criticism made against it is the practical difficulty of securing suitable subject-matter and teachers sufficiently awake to the educational needs and possibilities of community life to handle the right sort of problems intelligently in the schoolroom. As a matter of fact, the most pressing need of the time in arithmetical bibliography is a text-book packed with practical problems dealing with the quantitative aspects of school and social environment. Such texts are, however, tardily appearing,

and there is every reason to expect them to become plentiful before long. Teachers can render no truer service to contemporary arithmetic than by discovering and publishing new aspects of quantitative study of community life and school environment. Many progressive teachers are engaged in such work, but every grade teacher ought to be engaged in it. To say nothing of the service he might thus render to others, his own teaching would be greatly vitalized through the mental attitude secured by such effort. For, after all, say what we may to the disparagement of the investigator who has never made a special study of the problems of the pedagogue, it has yet to be proved that the investigator whose soul is aflame with a zeal for his science is not the very highest type of teacher. His spontaneous enthusiasm for the truth more than atones for his lack of acquired technique. His pedagogical principles are buried in the subconscious realm, and his practice is the most truly pedagogical of all.

A first prerequisite to putting arithmetic in the grades on an economic basis—*i. e.*, toward socializing it—is to bring elementary teachers to a realizing sense of the high educational value of a mastery of one's environment. A second prerequisite, which is at the same time a prime condition for the successful carrying out in the class-room of the idea just mentioned, is that this conviction shall rest so heavily upon the professional conscience of the grade teacher as to constrain him to identify himself vitally with his environment and to acquaint himself fully with the quantitative facts and factors which have a determining influence on the life of the particular community of which his school is the focus, and also those which have to do with shaping the larger life of the nation. Most of the evils of which the intelligent citizenship of our nation complains have their origin in the fact that teachers are willing slaves of the books. So conservative are the book-makers that the age which called for the solution of new problems must be well advanced, if indeed not wholly passed, before the new problems get to the teaching public in book form. The result is that the public schools that are manned and managed by book-slaves are turning out young

men and women equipped to take their places in the life of a bygone epoch rather than in that of the immediate present and future. From such schools the wonder is not that the school is debited with so many failures, but rather that it is debited with so few.

To the student of the present situation as regards elementary teaching, three phases of book-bondage are readily discernible among teachers. First, there are those who will have nothing to do with anything not already down in the books. The percentage of teachers which may be properly classed in this group would seem amazingly large to anyone on first becoming familiar with the facts. Happily, however, the percentage is rapidly diminishing. Secondly, there are those who venture far enough toward the light of freedom to replace certain numbers in problems by numbers more nearly fitting the facts of the community. And, thirdly, there are those who are ready to admit work in arithmetic from sources outside of the book after the validity of such work has been demonstrated in terms of what is already in the book. Then, thanks to modern progress, there is a fourth class of teachers not bookish in any blameworthy sense, which class is rapidly growing, who avail themselves of a text-book when it is a real help to the purpose in hand, and set it aside when it hinders. These are the teachers who use the book, but are not used by the book. Realizing that a good text may give trend and steadiness to the work of the learner, such teachers have no fear of the book, for the reason that they are above it, and have no difficulty in keeping the servant from becoming the tyrant. Fortunate, indeed, is it for education that there is always with us a goodly number of sane teachers, afflicted neither with text-book *mania* nor text-book *phobia*, who see in education something more profound and more potent than knowledge-getting—something the record of which is to be read in the growing powers of the child. Such teachers are the seed-corn of a crop whose fruitage will bless the next generation. They are the harbingers of a new educational era. May their tribe increase!

With the awakening civic conscience of which we are gaining

certain glimpses here and there will come a profound socializing of the teaching force in the elementary school. What is aspiration today will be realized tomorrow. Grade teachers will then not be satisfied with a pious wish that they were able to handle their environment in the arithmetic class; they will actually equip themselves for efficient service in this direction. Such subjects as the following will then be regarded as matters of course in arithmetical teaching, and not as mere fits and fads of professional eccentricity. The proper gradation of topics and of the treatment of individual topics, as also the extent to which the study of a particular topic should be carried, must, of course, always be carefully attended to. These important matters are, however, no more difficult with topics pertaining to the life of today than with those relating to the life of a past epoch, or, worse still, to nothing at all that is comprehensible to the pupil.

MODERN TOPICS FOR ARITHMETIC.

1. Meteorology: temperature, rainfall, barometric data; clear, fair, cloudy weather records; and yield of farm products for particular localities and for particular years and periods. (See *Rational Grammar School Arithmetic*, Scott, Foresman & Co., Chicago.)
2. Dairying and grazing.
   a) Butter and milk yield of individual cows, herds, and localities.
   b) Consumption of butter, cheese, and milk of communities and of the entire country. (See *Chicago News Almanac* for data.)
   c) Ranching and beef consumption of the country.
3. Manufacturing industries. (See *Twelfth U. S. Census* and newspaper almanacs.)
   a) Wool, cotton, sugar, iron and steel, and other industries.
   b) Consumption of products of these industries by the country.
   c) Making and refining coal oil, gasoline, benzine, naphtha, etc.
4. Mining industry. (See *Twelfth U. S. Census* for data.)
   a) Coal, iron, lead, copper, zinc, silver, and gold mining.
   b) Ore extraction and reduction.
5. Transportation. (See the *Census;* almanacs; and Thurston's *Economics and Industrial History*, Scott, Foresman & Co., Chicago.)
   a) Transportation by land and by water, and comparative cost.
   b) Street and electric railways. (See *Census Bulletin No. 3.*)
6. Growth and distribution of population. (See *Rational Grammar School Arithmetic*, Scott, Foresman & Co., Chicago.)

a) Population of the United States distributed as to geographical and political subdivisions.

b) As to elevation above sea-level and as to mean temperature and rainfall. (See *Twelfth U. S. Census.*)

c) Comparison of growth of population of the United States with that of other countries. (See newspaper almanacs.)

7. Roads and pavements. (See standard treatises and *Engineering Pocket-Book.*)

a) Wagon roads, turnpikes, and railroads; cost of construction, maintenance, and operation.

b) Force needed to draw loads over. (See *Rational Grammar School Arithmetic.*)

c) Numerical problems relating to railroads. (See *ibid.*)

8. Commerce in the rivers, canals, Great Lakes of the country, and by sea. (See Thurston's *Economics.*)

9. Business affairs. (See *Rational Grammar School Arithmetic;* Beman and Smith's *Higher Arithmetic,* Ginn & Co.)

a) Percentage with many other than money problems.

b) Interest by methods actually used in business.

c) Partial payments as actually used.

d) Compound interest by methods in vogue.

e) Applications of percentage, as in marking goods; trade discount; bank discount; domestic and foreign exchange; stocks and bonds. (See newspaper quotations.)

f) Loan associations and savings banks.

10. Nature study. (See *Rational Grammar School Arithmetic;* Jackman's *Number work in Nature Study for the Grammar Grades,* Macmillan.)

a) Habits of animals.

b) Planning and seeding a school garden.

c) Distribution of seeds.

d) Growth of trees and other plants.

e) Study of mechanical constituents of soils.

f) Movements of sun and moon; length of day, month, and year, studied observationally and from data of patent-medicine almanacs.

g) Distribution of sun's rays of heat and light.

11. Physical measurements.

a) Growth from month to month and from year to year in stature, weight, girth, chest measure, and lung capacity of children.

b) Vital statistics relating to birth- and death-rate of cities. Different cities compared.

c) Length of jump; distance of throwing the ball or of putting the shot; throwing at a target.

12. Geometry in the grades. (See *Rational Grammar School Arithmetic.*)
    a) Manual training-scale drawing.
    b) Elements of land surveying and field measurements.
    c) Modeling geometrical forms.
    d) Experimental and constructive work.
    e) Paper folding.
    f) Platting data.
13. Geographical work.
    a) Length, fall and commerce of rivers.
    b) Percentage problems relating to relief of countries and continents.
    c) Percentage of land and water surface of countries and continents.
14. Longitude and time. Local and standard time and date line.
15. Algebra in the grades.
    a) Representation by letters of numbers generalized from arithmetical number, and formulation of arithmetical processes in equations.
    b) Study of equations, showing simple relations between forces and loads needed to draw them.
    c) Use of simple equation in solving percentage and interest problems.

As an aid in the distribution of work on these topics in the different grades it will be well to note that the first conception of number is a group of individuals. Accordingly the number concept has its genesis in counting things, or, what comes to the same thing, in the indefinite measurement of groups of objects. Some time early in the first grade this stage of the number concept naturally passes into the concept of number as an instrument of direct measurement. This stage is reached through the natural craving of the mind for greater definiteness than is possible through counting. These are the two stages of the number concept out of which the notions of arithmetical number and its uses must be evolved, and upon which the tabular machinery of arithmetic must be gotten into working order.

This will require the first four or five grades. In these grades, therefore, the meaning of number and how to use it are the ideas occupying the focus of attention of the pupil, and they should receive chief stress in the teaching. Pupils should be continually employing their number faculty on real problems, the content of which should at first be easily grasped by them, to the end that the emphasis of thought may be on the disengagement of the

number concept and its uses from numbered things and magnitudes.

The guiding principle of the first four or five grades in arithmetic—"Employ useful and interesting materials for the sake of the number concept," should be changed by the fifth grade into, "Employ the number concept for the sake of an understanding of useful and interesting material." This shift of emphasis means much more in the arithmetic than is commonly thought. In the latter grades it is important that there shall be some difficulties to overcome.

Indirect measurement, for which the pupil is now ready, should play a leading rôle all through the grammar school. By indirect measurement is meant that sort of measurement in which unknown magnitudes must be arrived at indirectly through their relations to known magnitudes or to magnitudes that can be directly measured. Such measurement has to do pre-eminently with *relationships* among numbers and magnitudes. It is in this work that the pupil comes to an intelligent understanding of number as ratio. The pupil of the sixth grade, if his previous training in arithmetic has been of the right sort, may profitably undertake the study of number and numerical relations of magnitudes on the basis of the ratio idea of number. It is about equally unwise to undertake to teach this idea earlier and not to teach it here. It is about equally stupid to undertake the ratio idea too early and not to undertake it at all. The order of steps in the evolution of the number concept is such as is best exemplified in the physical series: (1) indefinite measurement, (2) direct measurement, and (3) indirect measurement.

For the aid of anyone who has never tried such material in teaching arithmetic as is advocated in this paper, and also to give an example of how such topics as the foregoing may be handled to secure connected thinking on the pupil's part, without the sacrifice of needful drill, the subject of street and electric railways is selected for treatment here. The data are taken from *Bulletin 3* of the United States Census Office. An important feature of the development of such topics as this in the arithmetic

is, we insist, in the connectedness and sequence of the work. The customary scattering problems of the arithmetics secure variety at the expense of connected thinking—rather an expensive price to pay. Finally, no teacher will make the mistake of thinking this topic must be worked out as fully as is here given with poorly prepared classes. It is developed with some completeness here to show what may be done with strong sixth- or seventh-grade classes in the way of correlating arithmetic with matters of real social concern.

ILLUSTRATIVE WORK.

1. The Chicago & Joliet Electric Railway Co. uses 46.19 miles of principal main track, 14.40 miles of secondary main track, and 2.30 miles of sidings and turnouts. What is the total mileage, and what percentage of the total is each kind of track?
2. 38.92 miles of this track is owned and the rest is leased by the company. How much is leased? What percentage of the track is owned? leased?
3. 39.13 miles of the track lie without the city limits. What percentage of the track lies without the city limits? Within the city limits?
4. The maximum weight per yard of rails used is 106 pounds and the minimum is 60 pounds. The heavier weight of rail is used within the city limits and the lighter is used wthout. Fnd the total cost of rails for the road @ $31.75 per long ton (2,240 pounds).
5. The total length of the 27 bridges owned by the company is 800 feet. What is the average length of a bridge?
6. 31.51 miles of the trolley wire are supported by a span wire, 13.05 miles by a side bracket and 1.63 miles by center poles. What percentage of the whole is supported in each way?
7. There are 53 trolley poles per mile. What is the average distance apart of the poles?
8. The company uses 32 closed and 16 open passenger cars, 24 freight cars, and 4 open and 4 closed combination passenger and freight cars. What percentage of the cars are combination cars? Closed passenger cars? Freight cars? Open combination cars?
9. 64 of the cars are equipped with hand brakes and 16 with electric brakes. What percentage of all is equipped with electric brakes?
10. In 1902 the road carried 4,439,692 fare passengers and 575,220 transfer passengers. The fare passengers comprised what percentage of all?
11. Find the number of fare passengers per mile of track.
12. The total number of miles run by passenger cars was 1,346,654. How many fare passengers did this give per mile of passenger-car run? How many miles run did a passenger car average?

13. During the year there were 71 passengers injured and 1 killed; 13 employees injured and 3 killed; 15 other persons injured and 2 killed. Find the total number of killed and wounded, and what percentage this number is of the total number of passengers and employees (1,360) carried.

14. The total number of passengers carried, killed and injured by all street and electric lines of the United States in 1902 were 4,809,554,438, 1,218, and 47,429, respectively; of employees the corresponding numbers were 133,641, 122, and 26,690, respectively. There were 831 other persons (not being carried) killed and 17,040 injured. Find the total number of the killed and the total number injured, and what percentage each is of the total number of passengers and employees.

15. The table given here shows the distribution of street and electric railway traffic with reference to the principal geographical divisions of the United States in 1890 and 1902. Fill out the blanks of the table and compute the percentages of increase in the numbers of the blank third, fourth, and fifth columns. Tell what these percentages signify. In which geographical division has each percentage of increase been greatest? Least?

TABLE I.

STREET AND RAILWAY SERVICE IN RELATION TO GEOGRAPHICAL DIVISIONS OF THE UNITED STATES.

Division	Year	Population (in Millions)	Passengers Carried (in Millions)	Average No. Rides per Person
North Atlantic	1902	21.05	2,618.53	———
	1890	17.40	1,141.19	———
Increase		———	———	———
Per centage of increase		———	———	———
South Atlantic	1902	10.44	332.54	———
	1890	8.86	101.65	———
Increase		———	———	———
Percentage of increase		———	———	———
North Central	1902	26.33	1,344.00	———
	1890	22.36	538.31	———
Increase		———	———	———
Percentage of increase		———	———	———
South Central	1902	14.08	210.10	———
	1890	10.07	98.01	———
Increase		———	———	———
Percentage of increase		———	———	———
Western	1902	4.09	304.38	———
	1890	3.03	143.86	———
Increase		———	———	———
Percentage of increase		———	———	———
United States	1902	75.99	4,809.55	———
	1890	62.62	2,023.01	———
Increase		———	———	———
Percentage of increase		———	———	———

16. Study Table II., fill out the blanks, and tell what the numbers you fill in mean. What change is noticeable in the various kinds of motive power since 1890? Which kind of motive power promises to supersede all others for street-railway service in the United States?

TABLE II.

DEVELOPMENT OF MOTIVE POWER OF STREET RAILWAYS OF THE UNITED STATES FROM 1890 TO 1902.

KIND OF POWER	1902		1890		PERCENTAGE OF INCREASE OR DECREASE	
	No. Companies	Miles of Track	No. Companies	Miles of Track	No. Companies	Miles of Track
Electric	747	21,920.07	126	1,261.97	———	———
Animal	67	259.10	506	5,661.44	———	———
Cable	26	240.69	55	488.31	———	———
Steam	9	169.61	74	711.30	———	———
Total in U. S.	———	———	———	———	———	———

17. Find the total number of employees of street and electric railways of Illinois and of the United States, and find the average yearly wage for each class of employees enumerated in Table III, which contains the data for 1902.

TABLE III.

EMPLOYEES OF STREET AND ELECTRIC RAILWAYS OF ILLINOIS AND OF THE UNITED STATES.

CLASS	ILLINOIS			UNITED STATES		
	Number	Total Wages	Average Annual Wage	Number	Total Wages	Average Annual Wage
Switchmen	96	$ 62,457	———	1,198	$ 728,975	———
Road and track men	603	346,333	———	11,474	5,511,425	———
Hostlers and stablemen	107	59,912	———	1,345	813,425	———
Line men	97	71,274	———	2,288	1,553,478	———
Engineers	104	92,442	———	1,751	1,527,793	———
Dynamo and switchmen	183	109,655	———	1,167	761,304	———
Electricians	67	47,711	———	1,150	901,524	———
Firemen	191	124,463	———	2,694	1,735,647	———
Mechanics	732	498,597	———	9,197	6,312,119	———
Lamp trimmers	14	7,405	———	338	197,254	———
Other employees	2,348	1,118,681	———	16,137	8,495,983	———
Totals	———	———	———	———	———	———

18. How do the average annual wages for Illinois and for the United States in 1902 compare with the wages of men of the same class in your community?

In all such work as the foregoing due regard must be had to movement and arithmetical unity. The unity which is prominent in the study just outlined is the economic significance of such railways in the development of our country. This unity will hardly be lost sight of, since it is the most immediate, the most concrete, and is the unity in which the pupil's thought and interest are centered. It is, indeed, this very unity that puts purpose into the study. But *arithmetic* must also be taught, and whether it be taught incidentally or for its own sake (if the latter were possible), it is unfair both to pupil and to subject to blind the learner to the only thing which can give arithmetical purpose to his effort; viz., the relation of the quantitative content of the subject-matter to the science of number. At the close of such work as the foregoing illustration calls for the arithmetical principles should be clearly brought out, that the pupil may not fail to see what he really had to do, and what it is he must master if he wishes to augment his power to do similar work. In our *rational* recoil from the study by immature pupils of a formal subject for its own sake the writer has seen more than a theoretical danger that we may go to the *irrational* extent of failing to teach arithmetic at all. This would be followed by another swing of the scholastic pendulum back to dead formalism, and everything would then have to be gone over again. If however, a study of the kind illustrated secure sufficient drill in operations with decimals and in finding percentages, the next topic should be selected with a view to teaching and drilling in other necessary principles and processes. It is well for arithmetic teachers never to lose sight of the fact that their office is not to *train experts,* but to *educate youth.* Education means movement under the stimulus of purpose, and to be educative arithmetical teaching must not lack in either unity or movement.

G. W. MYERS.

THE UNIVERSITY OF CHICAGO
College of Education.

COURSES IN THE TEACHING OF NATURAL SCIENCE IN THE COLLEGE OF EDUCATION.

THE courses in natural science offered in the College of Education are intended distinctly for those who desire professional training as teachers. They all assume, at least, that degree of academic knowledge of subject-matter on the part of the student which will enable him to grasp with some clearness the interrelations of the great subdivisions of science. They also presuppose that maturity of mind and experience on the part of the students which will enable them to take up with intelligence the study of the relations of the various subdivisions of subject-matter to the needs of pupils ranging from the kindergarten to the college.

Careful personal inquiry, therefore, rather than a formal examination, will be made into the merits of each case, with the purpose of determining what course should be taken, and with a view, also, to finding out what further academic preparation, if any, may be necessary.

To this end, the various courses are planned as consistent parts of an organic whole. In Course A, intended for high-school graduates, two and one-half science courses are prescribed. In Course B, intended for those who, in addition to a high-school course, have two years of college work to their credit, one and a half science courses are required. Just what these courses shall be will be determined in each case by the previous preparation and experience of the pupil. They will be chosen also with a view to forming proper relationships with the other subjects or any special course that the student may be pursuing. The courses, in addition to those required, are offered as electives. They are intended to give further training to those who desire to prepare themselves for special work in the grades, either as teachers or supervisors, or who may be preparing to teach science in high or normal schools. In the courses offered, an effort has been

made to develop a plan of teaching as a whole which shall be in acordance with the principles of psychology and pedagogy. So far as this is true, the plan should also meet the practical needs of the pupils for a knowledge of nature in their daily living. The earlier courses are devoted to an investigation of the general experience which children acquire in their direct contact with nature. While this experience is vague and lacking in detail, it is nevertheless well ordered and consistent. Nothing could be farther from the truth than to suppose that the mind of the child is in a state of confusion as regards the facts and phenomena of nature. It is true that the reasons for things observed are not distinctly formulated in the young mind, but there is nevertheless a general appreciation of natural causes which renders the nature-picture rational.

The preliminary courses, therefore, deal with those larger aspects of nature with which children at first become acquainted. The field work involved in Course 81 is directed toward a study of the region, considered as a whole, which lies adjacent to the school, and which depends for its character upon its antecedent and present relations to glacier and lake. It further involves a study of the causes which have led to a subdivision of this entire area into smaller units, each of which has something of a distinctive character of its own. Collections of specimens of soil, rock, plants, and animals are made in sufficient quantity to enable the pupils to make an intelligent comparison between the areas, one with another.

In Course 82 some particular area is selected for a more detailed study. An effort is made to discover the nature of the general and special problems which must be solved by the animals and plants that are found. This leads to a study of the temperature of the air and of the soil at different depths; to a study of moisture—rainfall, quantity of water present at different times and depths in the soil and in the air; to a study of sunshine distribution in the various seasons and at different hours in the day. The various problems are worked out to definite and quantitative results from observations and measurements made

on the grounds and by the necessary experimental work in the laboratories. Collections are made, and attention is given to a general consideration of questions of adaptation and structure.

Courses 83 and 84 pursue in greater detail a study of the subjects derived from those preceding. Course 83 deals especially with the biological aspects of nature study, and it involves such work in dissection as may be necessary to acquaint pupils with the gross internal structure of those forms of animal and plant with which they have been made familiar in a general way by previous study. The aim is to assist the students in the development of a plan for giving their future pupils an intelligent idea of the great functions and chief structures of the animal and plant bodies, thus laying a proper foundation for physiology and hygiene and general biology.

Course 84 seeks to develop a plan for introducing the pupils directly to some of the more obvious relations between the organic and inorganic divisions of nature. It includes a general study of the more easily determined physical and chemical properties and constituents of minerals, soils, and plants; also a study of such problems in heat, light, sound, electricity, and mechanics as have obvious bearing upon human life and welfare.

Course 87 deals with special experimental work of a historic character which will throw light upon the development of modern appliances found in human industries at the present time.

Course 85 is historical in character, and is based upon observation, readings, and lectures. Such works as those of Darwin, Huxley, Haeckel, Spencer, White, and others are used as references, with a view to giving the student a general view of the development of scientific conceptions as they stand at present. An attempt is also made to work out some of the more important bearings that these conceptions have upon the social, economic, and moral questions of the day. This is done in the belief that the training of a teacher is not complete unless special attention is devoted to a study of the principles of evolution as applied to the development of character in youth. Teachers are but beginning to recognize that physical development is a process of evolution;

they do not as clearly recognize that conduct is the result of the same slow process. This course, therefore, is devoted mainly to the organic and necessary relations which the study of nature bears to character as the true and safe basis for conduct.

Course 86 is devoted mainly to the broader pedagogical relations of science. One of the great obstacles in the way of the introduction of the study of nature into the schools is the feeling that in some way it will result in driving out of the curriculum, or at least in weakening, the work of some of the studies admitted to be essential. Although the history of the nature-study movement for the past ten years shows that this fear is not only groundless, but that nature study actually demands more and better work than ever before in other related subjects, the task of properly correlating all the subjects in the curriculum has not been clearly understood. This course will involve, therefore, a history of the movement, a consideration of a proper evaluation and place of studies, and a study of the changed and changing conditions made necessary by the great influx of new subject-matter that has recently come into the schools.

Corresponding to the broad presentation of subject-matter contemplated in these courses, there will be the same careful attention given to the various modes of expression. The different modes of expression are the recognized means whereby the image roused by presentation is limited and defined. The students will, therefore, be called upon for such work in drawing, painting, modeling, making, and writing as may be necessary properly to develop the subject with children. Observations will be constantly supplemented by reading, and due attention will be given to the selection of reading matter of an appropriate character. Number and form will be employed also from the beginning, in the determination of natural quantitative relations. The proper use of the latter subjects is absolutely necessary in the development of some of the most striking and beautiful of nature pictures. Their long isolation from the subjects in the curriculum and from the practical affairs of life, together with the blind devoteeism of most teachers to endless drill upon empty processes,

renders it extremely difficult to get students to study intelligently the relations of mathematical subjects to the necessities of image growth. It is small wonder, then, that while these conditions last it will be difficult to detect any improvement in subject-matter and in methods of instruction in these branches when such students become teachers.

In addition to the field and class-room work required in the various courses, opportunity will be offered for judicious observation and teaching in the elementary and high schools under careful supervision, counsel, and criticism. A considerable amount of time will be given to a consideration of this aspect of the teachers' preparation by round-table and seminar methods. This phase of the work, which will actually constitute the laboratory exercises of the courses, will be adapted, as far as possible, to the individual needs and qualifications of the different students.

The principal test as to the value of the work accomplished by the students who take these courses will be found in the evidences that the pupil can produce to show that he is able to teach and supervise the work in nature study and the elements of natural science in elementary, high, and normal schools. These signs of the student's professional merits will be gleaned from the exercises in the class-room and field, from the skill he shows in being able to express himself clearly in discussions, from the plans he prepares as a basis of his teaching, and finally from his poise and general effectiveness as a teacher before his class. Above all else in importance stands the character of the student; and these results will all be studied, therefore, in the light of his motive. If the student be lacking in true nobility of purpose, his preparation will always be superficial, and no amount of formal training will ever develop him into what the world really needs—a conscientious and efficient teacher.

WILBUR S. JACKMAN.

THE CORRELATION OF DRAWING AND MANUAL TRAINING.

THE subject of my paper today—the correlation of drawing and manual training—is not a new one. There has been for some time a desire on the part of our best supervisors of both branches for a closer affiliation and a more hearty co-operation; and already in the work of some of the larger cities the influence of one upon the other is strongly felt. But the last word has by no means been said. In some of the other cities and in places where the work is new, drawing and manual training have each their isolated place in the school curriculum; and too often the teacher of drawing undervalues the work of the manual-training teacher, while the manual-training teacher has a little secret contempt for the drawing teacher's talk about "art," "art feeling," and the like. That this is not the ideal condition I am sure we all agree, and the purpose of the paper and the discussion afterward is to see what we can do to better conditions and to find out why drawing and manual training—two members of the same family, sisters in fact—cannot be on terms of greater intimacy, more mutually helpful. As manual training is the younger and perhaps not quite so well known member, I would call your attention to a few points concerning its history, its present aspect, and its relation to drawing.

The growth of manual training has been from two distinct sources, representing opposite extremes of thought. It has grown, on the one side, from the technical school, and, on the other, from the kindergarten. The manual training of the technical school is purely utilitarian, while that springing from the kindergarten came purely as an educational idea. In the union of these two growths we have manual training in its present-day aspect—not, on the one hand, entirely technical and utilitarian, nor, on the other, as distinctly educational as it will be when it is more permeated with the spirit of the kindergarten, and when the

methods of such pioneer workers as Dr. Runkle, Dr. Woodward, and Dr. Belfield join hands with the thought of such thinkers as Dr. Dewey, C. Hanford Henderson, Stanley Hall, and others.

The high schools were the first public schools to introduce manual training, and they followed the methods used in the technical schools. The object was to provide for the high-school boy a more useful and lucrative occupation than that of clerk or bookkeeper, which were about the only fields open to the average high-school graduate. From the high school manual training gradually pushed its way down into the grades, borrowing in too many instances the high-school method of class instruction and the making of exercises.

From the opposite extreme, the kindergarten, very much and very important manual training has been taught, although not technically considered as such. The activities of the kindergarten —or the "manual training of the kindergarten," as it might be called—is entirely lacking in a commercial or utilitarian idea, and is solely for the development of the child; so much kindergarten work is ideal manual training, as clay-modeling, free paper-cutting, paper-folding, mat-weaving, etc.

This kindergarten manual training has been of infinitely greater educational value than the more technical kind which found its way from the technical schools to the high school. Of all forms of educational manual training the most valuable, it seems to me, is the work in clay-modeling. Work in no other medium supplies such perfect training for the senses of sight and touch, and develops such a conception of proportion, form, and beauty of line. If I could employ but one medium in my teaching, I would certainly choose this one. Free paper-cutting is a fascinating form of manual training, and when colored paper is used, the delight of the little workers is proof of its value. The more exact forms of this elementary manual training are paper-folding and cardboard construction. I believe in mechanical accuracy in its proper place, but I do believe there is a more important accuracy to be striven for in the first four grades of school work—viz., free-hand accuracy. I wonder why so many

teachers consider it necessary to make working drawings with ruler and compass in order to make them accurate, when a training of the eye and a study of proportion might be accomplished at the same time.

If I were called upon to give my opinion as to which class of teachers has done the more for manual training, I should have a difficult question to decide, for the service of the drawing teachers in the cause of manual training has been great. They have commenced at the right end, and their teaching has had a truly educational motive—the development of the senses of sight and touch; while the manual-training teachers have not always kept the educational motive in mind, and have concerned themselves too largely with merely technical skill. Each class of teachers, however, has been enthusiastic and has done much to bring about the condition of things which we have at present. Certainly this condition is hopeful, and the future points to better and still better things, as our work becomes known throughout the length and breadth of the land. But the end to which we are looking cannot be gained unless we look at our work in the broader sense, realize that we teachers of drawing and manual training are working for one great end, the educational development of the child, and join our forces that we may work hand in hand. I have letters from a number of men well known in educational work, touching this matter of a union of drawing and manual training, and what they say will have such force with you that I take the liberty of reading extracts from their letters.

Dr. Haney, superintendent of manual training and drawing of New York city, says:

> Much of the teaching of design can best be taught in its direct application, as applied pattern or as structural design, to things to be made. Much of the talk of teachers of drawing about art is loose. With a definite end for the teaching of the laws of beauty, such teaching becomes concrete, not abstract. Beauty in common things, concrete things, can best be taught by the making of such things. The points then come home to the child.

Mr Upton, supervisor of manual training, Buffalo, writes:

> Our educational processes will never produce their fullest results till the lines between subjects are broken down. Art without expression which

hand-work affords is superficial, and hand-work without the spirit of beauty will always be mere work, nothing higher. Artists have been mostly paper and paint artists, and manual-training teachers are sticking too closely to what they have been taught. Both are now reaching out into the field of the other, and good must come from these investigations.

From C. Hanford Henderson, a man who has written much of value on educational topics, comes this:

The two branches are and ought to be very closely related, and the teachers of them could gain much, I think, by coming into neighborly touch. This alone would be sufficient reason for such a union, but there seems to me other arguments as well. Both drawing and manual training are now highly developed specialties, and the tendency of every specialty is to produce a certain apartness which neither the specialist nor his subject can well afford. We need to be brought into closer touch with other related effort to escape the danger of getting things a little out of proportion. It seems to me, too, that such a union movement would accomplish an increased amount of good without a corresponding increase in the machinery of organization.

The president of the Milwaukee Normals has this to say:

Drawing can never accomplish its largest good divorced from constructive work, and it is certainly true that constructive work is of little value without drawing. The teachers of these branches should know each other and each other's work.

From the supervisor of manual training, Boston, we have this word:

We have just begun the practical correlation of drawing and manual training, in which both departments join.

Superintendent Balliet writes:

It will be very valuable to have a joint meeting of the drawing and manual-training teachers. I should go farther and say there ought to be a meeting of these teachers, the teachers of music, and the teachers of literature, to discuss in the broadest way the problem of art education. To have drawing teachers assume that art education is merely drawing is to narrow the subject in a most unfortunate way.

You will be interested in the thoughts of one of the pioneers of art education, Mr. John S. Clark:

I beg to say that I am decidedly in favor of uniting the forces of the art and manual-training teachers. In the art movement that is to come, great attention is to be paid to the subjects of design, through putting the work of design on principles rather than upon mere caprice or whim, and the

execution of design according to principle is going to call for a good deal of manual training, while the study of the application of design to use and material is going to be a great help for manual training.

These are only a few of the many letters received expressing an interest in the matter.

As a rule, criticism is merited, and when the feeling becomes general that there is something wrong with art education and manual training, it is not wise for the teachers of these subjects to disregard these signs.

A few years ago a good drawing supervisor was teaching clay-modeling, free paper-cutting, and paper-folding, using colored paper in teaching design, and was doing something in cardboard construction by using pattern sheets, and was making use of the geometrical solids; all of which was good drawing and excellent manual training. This practical and very important side of art education has been almost dropped. Twelve years ago, at the first meeting of the Iowa State Drawing Teachers' Association, there were excellent exhibits of clay-modeling. We look in vain for such exhibits now from the public schools. Free paper-cutting and colored-paper work have given place to brush work. Pattern work has been almost entirely dropped, while thousands of dollars worth of geometric solids are covered with the dust of five or six years. In place of this we have a great deal of nature-drawing in the lower grades with water color, and ink and brush, story-telling with the brush and colored crayon, pose-drawing, etc. The same sort of work is carried on through the grades: landscape from the imagination, pose-drawing with the brush, design in water color, object drawing "in mass," dark-and-light effects after the Japanese, etc.; all of which is excellent, and has come to save the work from the hard, inartistic, and conventional sort of way into which it was in danger of going. But is not the pendulum in danger of swinging a little too far in that direction? The drawing teachers, in their anxiety to make the results artistic, to have "free work" and not to cramp their pupils, often sacrifice truth, especially in much of the nature work seen. As the pupils approach the eighth grade, much of

the nature work should be done with the pencil point, and time should not be lost by making the lessons too elaborate. The pupils should give more time for study and comparison, with opportunities to try again.

The drawing teacher who is so permeated with the art idea that she has not time to teach clay-modeling, free paper-cutting, cardboard construction work, and the legitimate use of the geometrical solids in teaching the pupils how to see and study, is doing a great deal toward meriting such accusations as Dr. Haney's: "Much of the talk about art is loose."

Please do not misunderstand what I have said about drawing, for I thoroughly believe that the subject is being better taught every year; but I feel that very important forms of drawing have been disregarded in recent years.

Manual training has been making great strides during the last ten years, although there are many false methods of teaching yet to be rectified, such as beginning the work in the high school, and basing the method of teaching on that of the technical schools, employing artisans as instructors instead of trained teachers, and trying to make manual training an end in itself instead of a means to an end.

I asked the assistant superintendent of the London School Board Manual Training Department what in his judgment was the most important thing in manual training, and he answered: "Tool manipulation." The London course of study shows the same answer. The London boy certainly does know how to use his tools, but Mr. Barter's teachers are giving the same exercises and models that were in use ten years ago. His teachers are almost all artisans, with very meager conception of the educational value of their teaching, and, as far as I could see, manual training was an end in itself.

A number of our high schools have similar courses. "Tool manipulation" is the watchword. A set of graded exercises is worked out by each pupil, followed by completed models, or these models are made, alternating with the exercises. There is no beauty in the lap joint, or in fact in any of these exercises, and

it is not surprising to find the models in such a course as devoid of beauty as the exercises with which they alternate. In most cases every line and angle can be tested with the rule and trisquare, and the series may justly be called a carpenter's course. Need I say that right here is a field for the drawing supervisor?

In strong contrast to this, and directly opposite to it in method, is the Swedish sloyd. This handicraft was practiced for three hundred years in the Scandinavian countries before Dr. Salomon adapted it to the needs of the schools of Sweden. In its original purity it possessed high educational merits, for the articles made were designed by the maker, and were for use and ornament in the home, and not for sale. Dr. Salomon's adaptation has preserved this educational feature in theory, if not in actual practice, as the sloyd course is based on a series of exercises which are taught while the pupils are making useful models. These models may be as varied as the minds of the workers, and a hundred different localities might all be teaching sloyd without duplicating a single model, while a single teacher may have a group of a dozen models for each exercise, and, better still, the pupil may design a new model if he can make it simple enough. Here is another large field for the drawing teacher—constructive design.

In the course at Oshkosh each pupil designs a model to take the place of some model in the course four times each year; and at all times he is at liberty to design his own model, should he so desire.

It is this sloyd which has appeared in the United States to fulfil a mission, and to take up and apply in the grades the educative principles of self-activity which are the spirit of the kindergarten. The influence of sloyd is entirely changing the methods of teaching in such schools as Pratt Institute and Teachers College, and there is growing up an American educational manual training to take the place of the old methods. This is a combination of the spirit of the kindergarten with the methods of sloyd, in addition to a third element, which is purely American, and comes to us from the colleges, and from the investigations of

such men as John Dewey, of Chicago. Through this third element manual training will eventually relate itself to everything in the school curriculum; but it must first relate itself to drawing, or "art;" for it still lacks much of the spirit of beauty. Especially in the field of invention and design our present manual training shows its weak point. A pupil cannot design a good model without knowing the difference between good and bad constructive design, and when the manual-training teacher cannot tell the difference, we have a deplorable state of affairs. When we go one step farther into the field of ornamentation, we enter the slough of despond—a poorly designed model is mutilated by a hideous reproduction of Pharaoh's horses, or a Rebecca at the well, burned in an atrocious manner; and this sort of work the manual-training teacher calls "pyrography." Poor Pharaoh's horses could not be a more pitiful sight had they been literally driven through fire. We need the aid of the drawing teachers to help us to see what good constructive design is, and when this will be enhanced by simple, tasteful decoration; and the drawing teachers need our help in order to have something of this kind to design and decorate.

Says Henry T. Bailey:

There is no room in the elementary schools for both drawing and manual specialists. Teachers of manual arts in the lower schools will ultimately become teachers of manual arts specializing as artists in the high schools, or teachers of manual arts specializing as craftsmen in the high schools. Teachers of tools and teachers of theories are equally undesirable. Teachers who can use tools well, but without taste, and teachers of taste who can do nothing themselves, are blind teachers of the blind.

Dr. William T. Harris says:

I am heartily in sympathy with the ideas expressed in the circular. The getting up of traveling exhibits and sending them from place to place is a piece of missionary work which will bring forth good fruit. But the best idea yet suggested is the union of the manual-training and drawing departments. Manual training has, I think, suffered somewhat since its first beginnings from a separation of its courses of study from the fine arts. Ornamental products always take the market away from the merely useful products that neglect ornament.

In connection with manual training, art should be taught in such a way that every pupil will learn something regarding the principles of good taste

in the arrangement of his materials and in the form and efficiency of his work.

It would double the value of manual training if pains were taken in this matter of good taste as to form and arrangement. I therefore wish you success in the proposed movement.

Mr. Richards, of Teachers College, adds:

Among all the possible correlations of school studies none is so natural and essential as that between construction work and art in structure.

Colonel Parker said:

These two lines of work are essentially one. Teachers have made a separation between them; they are one to the child. . . . . We manual-training workers have been thinking of ourselves as outside the field of art, but, as a matter of fact, we are constantly exerting an influence, good or bad, whether we will or no.

Every constructive project is a concrete example of form, proportion, and color of a positive character. Such work may become, in my judgment, the most powerful æsthetic influence within the possibilities of the school, and the realization of this possibility at the present time, it seems to me, means the co-operation between the drawing and manual-training teachers of the kind suggested for the new association.

In closing, let me repeat and emphasize Mr. Bailey's thought:

There is no room in our elementary schools for both drawing and manual-training specialists. Teachers of tools and teachers of theories are equally undesirable. Teachers who can use tools well, but without taste, and teachers of taste who can do nothing themselves, are blind teachers of the blind.

There is one solution for this problem: Drawing supervisors who neither understand how to teach the use of tools, nor how to use them, should attend summer manual-training schools until they acquire this knowledge; and manual-training teachers should study drawing in the same way. All of our large cities and normal schools follow the example of New York and place drawing and manual training under one supervision. This means that the supervisor must know drawing and manual training equally well. It would be unfortunate for a school to have a supervisor who would disregard the claims of either subject. It would be possible for such schools as Teachers College, Pratt Institute, and the Art Institute of Chicago, by making their course three instead of two years, to graduate teachers who could supervise both branches.

L. D. SUMMERS.

BASKETRY.

THE work outlined in this article was given to eight-year-old children in the autumn, because of the abundance of material at this season. Indian weaving and basketry were selected for this age, because on the constructive side, in the development of appliances, they naturally follow the other primitive work. They also bring the children in touch with the life of the people they consider at this time in their history.

The same method was followed in the basketry as in the primitive work; that is, the materials used furnished suggestions in æsthetic ideas, technique, and construction. The children used natural materials which they collected for themselves, gathering grasses during the summer, and making excursions in the autumn to the neighboring marshes. The possibilities of the work vary, of course, with the locality; but if the children are encouraged to collect their materials, immediately a broad field of observation is opened to them. Much more is gained than the technique of basket-making, or the study of Indian basketry in itself; the latter might furnish sufficient material for a collector or a connoisseur, but has little meaning for children.

In selecting material suitable for basketry a study can be made of the rushes, sedges, and grasses gathered, their condition of growth, and their general position in plant life. There are so few interests to carry a city child into the country that if the gathering of the grasses gives that impulse, it makes it a connecting link with a new world. The grasses are incidental perhaps and the child becomes lost in contemplation of all the living things which the particular region affords. He goes not so much, after all, for the facts, or the new materials discovered, as for the sake of fresh, healthy, and lasting impressions received, and the consequent enlargement of his point of view.

Often during the summer season children spend their vacation in different parts of the country. From one class it might be

possible to secure grasses from California, Kentucky, Tennessee, the New England coast, or from regions along the Great Lakes. In this way grasses of many sorts may possibly be studied. The point of contact with different regions through the work with these grasses awakens an interest in the children in an environment other than their own, and broadens their horizon.

The care and preparation of the grasses carry the child to a further appreciation of their quality and beauty than he gets from a mere understanding of their application. In drying the grasses their constant change and variety of color suggest different modes of working toward securing whole series of colors. Through the greens, browns, and yellows which naturally appear, the child may be led to vary his process in such a way as to produce infinite numbers of shades from all of these colors.

In working in an intimate way with the grasses of his neighborhood the child comes to know the exquisite colors and quality of textures in natural plants, and refuses to accept the monotonous uniform coloring given by aniline or vegetable dyes on a dead material which he is told grows "somewhere"—in Madagascar perhaps. The hue and cry against aniline colors is often regarded as a pose of "arts and crafts" enthusiasts. But when one realizes what opportunities are lost through the use of this prepared material, a justification of successful form and color combination would never be accepted.

The child's finished product is perhaps crude compared with the basket or mat made with prepared material, but what he gets from it is infinitely more worth while. This product contributes to an appreciation of nature, and through the control of nature's material he realizes the pleasure of artistic creation. It has brought something into the life of the one who made it. It is not a dead article, made with countless mechanical stitches, which has neither social interest based on the life of a people nor has contributed to the child's own experience. The making of a basket in many cases begins and ends with the "stitches." If the object of the basket is to teach stitches, raffia, or any as excellent material, serves the purpose. But why not teach sewing out-

right, which is surely more useful, and which serves the educational purpose as completely? Learning stitches is a simple matter, and after this is done there is little place for basketwork in the school, unless the undertaking is carried farther and the child derives from it something more of what the people got who developed the art.

The baskets can first be produced for form and color effects, using coarse material and a simple mesh or stitch, that the child may not be lost in the mechanical effort of weaving; but his interest in the basket as a whole must be held; and this principle in art instruction can be used with profit throughout the development of basketry, whether it be considered as a craft or as a means in education.

The change of color in a grass, introducing incidentally spots or lines of light and dark, suggests the idea of decoration, and consequently the combination of grasses in different colors to secure effects in design. If the attention is given first to form and color, the experimentation upon different grasses soon carries the child to the idea of new weaves, and to the discovery that these must be adapted and modified to suit the material. The typical weaves can be given, and some knowledge of how these are varied, in order that they may be used, not only in the construction of baskets, but also to form a basis for classification in the study of Indian basketry.

This direct handling of material can be supplemented by visits to museums, where the best types of basketry can be studied. The child enriches his own experience and gains further knowledge of technique in weaving, in construction, and in design by the sympathetic observation of these types. He discovers varieties of texture hitherto unknown to him; new modes of preparing the raw materials are also obtained, and further variations, such as the Indian method of coloring by drying, by burying in charcoal, or by using vegetable and mineral dyes. He also observes that in the best specimens of basketry the natural-colored materials are used for design, and that fruitful material for study is offered in the simple geometric forms common to early primitive peoples, and later in the further development of

realistic symbolic forms. The children might be interested in working out symbolic forms for their own region. The idea of symbolizing is presented in connection with their history to children at this time. They now get the idea of the first signs or symbols of the alphabet. Some of the children made alphabetical signs of their own. The idea might be carried to the point of arousing an interest in symbolizing in general, making it real and definite by symbolizing their own everyday surroundings.

Having acquired sufficient experience to examine intelligently the Indian basketry, the child has gained an insight into the life of these people, and there is opened up for him a new field of interest, a new world complete in itself, and satisfactory to his infinite questionings.

In examining the baskets for form, design, and color, some idea of their use should be given. The skill, time, and labor put into ordinary household utensils may thus be realized. The kinds of food prepared and the method of cooking are indicated. The various characters of the baskets, showing the weaves commonly used by the various tribes, indicate also the nature of the raw material, which leads ultimately back again to the character of the environment of these tribes. The child is thus brought into close touch with the home life of these previously unknown people. So, both from the obvious differences in racial habits suggested by these baskets, and from the more subtle points suggested by their materials and their construction, the child gains a clearer and more adequate conception of what the life of these people means than he could have obtained through any formal study of material transcribed by another. The Indian woman has put the best of what she has of artistic refinement and technical skill into her work. Through her individuality we get the best of what the people had to offer—we get a view of their life from its best side. Combining this with what the child gets from his experience with nature, and with the technical training acquired in working with nature's materials, it would seem that basketry might find its place in elementary education.

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GENERAL EXERCISES.

THERE has been enough discussion of the need of a social habit of mind and social service to convince one that the child in the grades, or the student in college, who does nothing more in the pursuit of an education than attain good scholarship is choosing too narrow a course. According to Cecil Rhodes, *scholarship* should possess the worth of three points where *ability in sports, manhood,* and *service to others* count as seven. This judgment of an acute man of the world probably approximately represents that of observant people in general. A good education includes all these factors, and even some other equally important ones, perhaps.

There are always some persons who, owing to their native tendencies, home environment, or other peculiar advantages, enjoy a variety of experience sufficient to develop them freely in all these respects. But a majority seem dependent upon the schools for their estimate of relative values and their corresponding growth. They may be properly broadened through the influence of the school, or may easily be led to ignore those opportunities for improvement that are not distinctly bookish.

There has been a marked tendency in the latter direction in most schools. Certainly the average adult will testify that he never received the impression from the school that scholarship is only one in a half-dozen elements in a good education, and most of us have had to be jostled by the world for a number of years before becoming sufficiently freed from the schoolroom atmosphere to conceive this fact.

It is a vital matter, therefore, to consider when and how the common school plans to impress upon its pupils the several essentials in a good education besides scholarship, and to give to each its approximate relative value.

Two changes of recent years tend in this direction. In the first place, the greatly increased amount of construction exposes

the relation of theory to practice in much the ratio that is found in the world in general; and, in the second place, the recognition of actual service to others as the true end-point of instruction, rather than the mere acquisition of knowledge or skill, promises to make school work less theoretical. The two will help much to make school work a healthy representative of real life.

But, no matter how good the instruction in the individual studies may be, it is almost sure to overemphasize knowledge, and thereby to underestimate other good things in life. This must be the case, not only on account of established practice, but because a great number of the chief topics of common interest find no definite place in the separate studies, as these are now constituted. For example, "one's fondness of and success in manly outdoor sports," as Rhodes put it, which he regarded as two-thirds as important as "one's literary and scholastic attainments," are ordinarily unprovided for in the curriculum. Even where physical education has a definite place on the program, its purpose is only such exercises as may lead to health, rather than a deep-seated love of sport and skill in playing games. Yet a love for sport is of immense value, like a love for literature, being the best guarantee of physical health of body and mind, just as the latter love insures mental life and moral health. And, owing to this omission, it is not uncommon to meet adults who admit never having learned to play well with others, or to enjoy such play.

Sociability is another quality that finds no definite place in the curriculum. Many children habitually isolate themselves from companions during intermission, for the sake of a little more study, or because they cannot take part in the enjoyment, or because they have learned to contemn conversation as an idle employment. Yet, if either geography or sociability had, for some reason, to be neglected, no one would long hesitate in allowing the neglect to fall on the former. How many other things might be named that are extremely important, but that do not fall legitimately within any of the studies!

Where and when are such matters to be treated? The school is not, of course, responsible for everything; but, since good

character is its aim, it must place the leading elements of character before its pupils, and must develop fair appreciation of their relative values. What better provision is there for this, and for much allied work, than that found in the general exercises of the school?

General exercises would thus assume a very important place, and I am convinced that that is their due. While they should avoid duplicating the studies, they should broaden the child's horizon much beyond that of ordinary instruction, and present the elements of good character to pupils concretely and in proper perspective. To do this well would require much time and planning, and would make the general exercises so prominent that they, more than any other kind of work, might indicate the true nature of the school.

Only by some such arrangement can the personality of a forceful teacher find opportunity for full expression. The studies furnish such an outlet to some extent: but a broadly interested leader needs many other occasions also. One to whom no topics of worth occur for such times stands self-condemned as leading too narrow a life.

The college feels this need, just as does the school. College students very often remark on the narrowness of their individual studies, and long for some agency by which they may be brought into closer touch with a larger world. But the school can solve the problem more easily than the college, because its conditions are simpler. The first requisite, however, in either case is to take the question seriously and put an abundance of work on its solution. Some inkling of the possible benefits from such efforts have been suggested to very many persons by the morning exercises in the old Cook County Normal School under the régime of Colonel Parker.

What kind of work might general exercises properly include? First of all, worship, where the law of the state does not forbid. But a perfunctory reading of the Scriptures and repetition of a prayer probably dull the spirit of reverence rather than quicken it. Why do many of the better schools apply the principles of psychology most earnestly to instruction in nature-study, etc.,

and apparently forget the existence of such principles when it comes to worship of the Lord? I find no explanation of the fact, except that principals and superintendents—who are the leaders in devotional exercises—ordinarily give so little instruction that they do not hold themselves amenable to the same laws for good teaching as their own teachers must follow. Good pedagogy would seldom allow a chapter in the Bible to be read without comment, and very often the remarks should precede, rather than follow, the reading. An occasional short, earnest prayer by the leader is also greatly needed, to lend meaning to the repetition of other prayers. Freshness and life in worship at school are especially important, because worship elsewhere is usually so dull to children. Variety in the form of exercises thus becomes a law; but close sequence within one day's exercises, and from day to day as well, is as binding here as elsewhere. A certain school containing children of ages from six to twenty years recently gave a fine example of what should *not* be, by the following program: (1) a love scene from Wagner's *Walküre,* on the piano—sensuous in the extreme; (2) a pietistic hymn; (3) the Lord's prayer; (4) a Vedic hymn read, without introductory remarks; (5) a church hymn.

In school, if anywhere, is there an opportunity to teach the real purpose of music in connection with worship; and with that object there should be the closest possible correlation of thought of songs with that of the other exercises, and all together should form a unit.

The occasional omission of Scripture and prayer, for the sake of time, to introduce a "moral talk" seems to me also fitting. The teaching world has grown skeptical of regularly scheduled moralizings; but the need of forcible talks on conduct has not yet been outlived; and fitting opportunities for them are still abundant. A proper utilization of such occasions is the highest mission of the teacher.

There is a great waste of opportunity in not calling in a stranger for a talk occasionally. Very frequently persons are within reach who are well fitted to discuss some important event, to express a personal view about some moral question, etc., in a

simple, entertaining manner. The risk of an occasional failure should not dissuade teachers from such a course either, because pupils tire of school routine and personalities, and a few words from outside, supporting ideas perhaps already presented, have a very restful, stimulating effect. The failures in these efforts would be less frequent than they are, too, if definite suggestions were given to such speakers as to the topics that might prove peculiarly fitting. If, for example, a competent man were asked to talk to a school on "How to Read Newspapers," or on "Some of the Ways for a Family to Find Entertainment Together of an Evening," or on the "Worth of Sociability," the greatest obstacle to consenting to speak might be overcome, and unusual profit would be likely to result. Teachers who are watchful of the needs of their pupils would not fail to carry such topics in stock. The introduction of strangers to the school—always carefully coached—might well constitute one of the most important parts of general exercises. At these times, too, parents could be especially invited, the occasion thus furnishing a means of identifying them with the school.

But a good part of the exercises should be given by the children themselves. In the ordinary recitations the interest centers largely in each child's ability to "take in" what the teacher or book presents. The spirit is individualistic. The general exercises should be far more altruistic, expecting individuals and groups to make frequent contributons for the entertainment and improvement of their companions. Thus, committees might make reports; one class might offer an entertainment devised by itself; a larger group might sing songs newly learned; quotations, reports on favorite books read, and debates might be listened to. The work there done would be of a much broader character than that of the ordinary hecitation period, and would throw into perspective the facts of instruction. The last benefit would certainly result if the teacher kept relative values well in mind, as suggested at the beginning of this article, and saw to it that the right emphasis was laid on the main qualities that lead to usefulness and efficiency.

Large numbers themselves are a valuable aid in cultivating

the altruistic spirit. The group-feeling is stimulated whenever a child finds himself one of a great many engaged in a common end. To the extent that his own insignificance is impressed upon him, his capacity for devotion to the general good is increased. Under the influence of numbers, therefore, altruistic appeals are most likely to be made with success; the need of unity is then apparent, and right school traditions may become established. In other words, a peculiar and very valuable kind of work can be best accomplished by bringing many pupils together.

I have attempted to show that general exercises, having a special purpose, are worthy of time on the program and very careful preparation. Whether they should be planned for daily, should come always at the same hour, and should cause the entire school to be assembled, are questions the answers to which might vary according to conditions. But, certainly, carefully prepared exercises coming once per week are preferable to a very brief daily exercise. Many objects, too, can be better accomplished in the smaller groups, consisting of children from one or two or three rooms, than in an assembly of all grades. And some flexibility of the program is highly desirable, whereby an ordinary recitation period of a grade may be given over to a general exercise, owing to a need that has unexpectedly arisen.

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LITERARY NOTES ON RECENT BOOKS.

MISS INIS H. WEED, in the *Commons* for July, 1903, gives the following interesting discussion of *The Place of Industries in Elementary Education*:

"Miss Dopp seems to have absorbed the best that Darwin, Froebel, and Professor Dewey have given to the educational world, and after several years' teaching has made an attempt to supply the need, which Miss Jane Addams and many others have so keenly felt, of giving a historic background to the great mass of workers in an industrial society daily growing more complex. 'As the end becomes farther and farther removed,' she writes, 'the worker, no longer being able to perceive the whole process of production, has need of a greater consciousness of collective life' in order to maintain the quality of his life and work.

"The main content of the book is devoted to showing the parallel between the industrial activities of society from primitive times to the present and the psychical attitudes of the child. She points out that our industrial development does not differ organically from that of the past, but in its complexity. In simple social groups, industry has been the matrix holding the other interests of life, as art and science, until they were strong enough to stand alone, and because industry is the very substructure of society, conditioning all other activities which should have a place in the education of the young. The psychologists have found that just as society has passed through the different industrial epochs — first, the period of domestic economy, including the hunting, fishing, pastoral, and agricultural stages, the ages of metals, travel, trade and transportation, the city, state and the feudal system; second, the period of town economy or the handicraft system; and, third, our own period of national economy or the factory system — so the child passes through the same physical attitudes in relation to industry.

"It is out of the question to add more to our already overcrowded school curriculum. Instead, a reconciliation must be brought about between the child and the subjects already there. The introduction of industry in an organic way would do this, each new study being taken up as the content of life is reached which gave rise to it. One chapter in particular, the outgrowth of her endeavor to carry out this method in her teachings, is rich in suggestions. This working up through the more fundamental processes of life, and finding out how the need for each science, art, and industry arose, and their consequent development, will afford a measurement by means of which the child can interpret the materials of the present which are presented to him in less direct ways. 'Practical activity, which is an expression of the child's interests and capacities, socialized by racial experience, is not only the best means, but the only means thus far discovered by which the child can organize the subject-matters of education. It finds its justification in the race parallel, in the fact that it is the way the child learns before he comes to school, the way he can lay the best basis for the later activities of life, and the way he will continue to learn after the walls of the schoolroom are left behind.'"

Studies in Logical Theory. Edited by JOHN DEWEY, with the co-operation of the Members and Fellows of the Department of Philosophy.

THIS volume contains the results of the investigations carried on for the past eight years at the University of Chicago. The research has been a series of critical and constructive studies along the lines of the recent works by Bradley, Bosanquet, Lotze, and Swigart, as well as some of the earlier English writers. Among the contributors, besides the editor, are Dr. MacLennan, of Oberlin College; Dr. Stuart, of the State University of Iowa; Dr. Helen Thompson, of Mt. Holyoke College; and Drs. Moore and Ashley, of the University of Chicago.

xiv, 300 pp., cloth, royal 8vo; *net*, $2.50; postpaid, $2.67. The University of Chicago Press, Chicago, Ill.

The Psychology of Child Development. By IRVING KING. With an Introduction by JOHN DEWEY.

THE former basis of investigation for child-study was the assumption that child-psychology was simply adult psychology reduced to lowest terms. This led to a great variety of detached statistics collected and interpreted in an unscientific manner and therefore inconclusive.

Mr. King develops the idea that the study of the child's mind should be carried on from a different point of departure. The object of the new method of investigation should be to find out how and under what circumstances the mental processes arise, and what they mean to the *child*, not to what they are analogous in the adult mind. Above all, the investigator must appreciate these processes, not by themselves, but by their place and value in the entire conscious life.

The author from this new point of view sketches the process of mental growth in children, with especial reference to their development during the school years. This he deduces from their interests in books and games during that period. No new material is presented, but rather an outline of a functional interpretation of the well-known facts of child-life, showing what the multitude of observations of child-psychology can mean.

280 pp., cloth, 12mo; *net*, $1.00; postpaid $1.10. The University of Chicago Press, Chicago, Ill.

The Mental Traits of Sex. By HELEN BRADFORD THOMPSON.

"SO MUCH time and space have been spent in digging out and exploiting the differences between men and women that any number of individuals of one sex or the other have come to think that at bottom there is no substantial identity. It is hardly worth while saying that there are far more traits and characteristics held in common by the two than there are differences, but it needs to be said with a loud voice in order to remove a number of utterly unreasonable prejudices.

"This has been the not unpleasing task of Miss Helen Bradford Thompson, Ph.D., who was for a time fellow in the department of philosophy in the University of Chicago and is now the director of the psychological laboratory at

Mount Holyoke College. Her book is called *The Mental Traits of Sex: An Experimental Investigation of the Normal Mind in Men and Women.* It contains the results of tests, carefully devised and executed, of twenty-five men and as many women, taken somewhat at random from the upper classes and graduate department of the University of Chicago within the last two years, the selection being made among this class in the community because men and women in coeducational institutions of America, beginning with the public schools and ending in the universities, present fewer points of difference in their training than are likely to be found elsewhere. It is one of the important conclusions of the work that by far the most apparent differences between men and women come from training and education, and not from any inherent or intrinsic differences from sex; so this point was necessarily insisted upon in the selection of the subject-matter for experiment.

"The ground covered in the tests includes questions of motor ability, skin and muscle senses, taste and smell, hearing, vision, intellectual faculties, and affective processes. A chapter is given to each of these varying inquiries, and each chapter contains as well a review of all the work done on similar lines in the world of science in recent years. The final chapter brings together all the facts elicited by the experiments and compares them with other similar facts, so that less than an hour's reading will put the curious in full possession of all that the world really knows experimentally, as distinguished from empirically, concerning men as men and women as women."— Chicago *Daily News.*

viii, 188 pp., cloth, 8vo; *net*, $1.25; postpaid, $1.35. The University of Chicago Press, Chicago, Ill.

BOOKS RECEIVED.

Boston: A Guide Book. By Edwin N. Bacon. Boston: Ginn & Co., 1903. Pp. x, 190, 16mo; leatherette. $0.50, *net.*

First Book in Hygiene. By William O. Krohn. New York: D. Appleton & Co., 1903. Pp. 144, 12mo; cloth. $0.35, *net.*

Agriculture for Beginners. By Burkett, Stevens, and Hill. Boston: Ginn & Co. Pp. 267, 12mo; cloth. $0.75, *net.*

The Jones First Reader. By Lewis H. Jones. Boston: Ginn & Co., 1903. Pp. 160, 12mo, illustrated; cloth. $0.35, *net.*

The Jones Second Reader. By Lewis H Jones. Boston: Ginn & Co., 1903. Pp. 208, 12mo, illustrated; cloth. $0.40, *net.*

The Jones Third Reader. By Lewis H. Jones. Boston: Ginn & Co., 1903. Pp. 287, 12mo, illustrated; cloth. $0.50, *net.*

The Jones Fourth Reader. By Lewis H. Jones. Boston: Ginn & Co., 1903. Pp. 416, 12mo, illustrated; cloth. $0.65, *net.*

The Jones Fifth Reader. By Lewis H. Jones. Boston: Ginn & Co., 1903. Pp. 496, 12mo, illustrated; cloth. $0.75, *net.*

Primary Arithmetic. By W. J. Milne. Chicago: American Book Co., 1903. Pp. 160, 12mo; cloth. $0.25, *net.*

Child Literature. By Mae H. Simms. Chicago: American Book Co., 1903. Pp. 144, 12mo, illustrated; cloth. $0.35, *net.*